

runoff from the proposed C/D would involve a combination of treatment measures. Based on the statement above, a portion of the runoff could be placed into the existing system. The amount would correspond to the existing impervious surface area as represented by present streets (2nd and 3rd Avenues in the city and 3rd and 4th in the county) and portions of I-90 that would be replaced by the proposed C/D. The remaining (net increase) would be handled through other BMPs.

Mitigation

No mitigation is proposed.

Flood Plains

Studies and Coordination

Flood plain information was obtained from the Washington State Department of Ecology (Ecology), the city of Spokane Planning Office, and the Engineering - Division of the Spokane County Public Works Office. The following references were also used:

1. Flood Plain Management Handbook for Local Administrators
2. U.S. Geological Survey (USGS) Topographical Maps
3. Federal Emergency Management Agency (FEMA) coordination
 - National Flood Insurance Program Flood Insurance Rate Maps (FIRM)
 - Floodway Maps
 - FEMA computer flood plain model for backwater studies.
4. *The Spokane Aquifer, Washington: Its Geologic Origin and Water-Bearing and Walter-Quality Characteristics*, by Dee Molenaar
5. Corps of Engineers coordination
6. City of Spokane and Spokane County planning agency officials (Shoreline Permit and Flood Plain Development Review)

Refer to the Public and Agency Coordination Section of this EIS for additional information.

Any new bridge constructed within the Spokane River or adjacent wetlands/ - habitat/shoreline will require a 404 nationwide permit from the Corps of Engineers (Corps) and a Hydraulic Project Approval (HPA) permit from the Washington Department of Fish and Wildlife (WDFW). The work is expected to qualify for 404 nationwide permit numbers 13 and 15. The Corps Regional Engineer has been consulted regarding this project; see Chapter 5 for specific information about this coordination.

A Shoreline Permit and Flood Plain Development review by the city of Spokane will be required for any new bridge over the Spokane River, prior to construction. The city of Spokane adopted its Shoreline Master Program in 1976 to regulate development within 61 meters (200 feet) of the ordinary high water mark (ordinary high water mark is determined by the permitting agency).

- A backwater analysis will be done before final bridge design. Cross sectional measurements of the river will be taken and modeled (using the FEMA computer model) to ensure that construction of the structure will not decrease the channel carrying capacity or increase the 100-year flood plain elevation by

more than that allowed by the city of Spokane's Shoreline Master Program. The backwater analysis and all other requirements of the Shoreline Permit will be met for construction within 61 meters (200 feet) of the ordinary high water elevation.

- A Stormwater Site Plan covering both temporary and permanent water quality/quantity BMPs will be developed for each phase of the NSF project. The site plan will also cover the requirements of the National Pollution Discharge Elimination System (NPDES).

Affected Environment

There are three flood plains within or near the boundaries of the project alternatives (see **Figures 4-12 to 4-14**). One flood plain is at the Spokane River crossing along the Market/Greene and Havana routes (both within the city limits). Another of the flood plains is northeast of the project near the intersection of Francis and Havana on the Havana route. The third is to the north of the study area along the Little Spokane River and will not be impacted.

There are two dams in the vicinity: Upriver Dam approximately two miles upstream from the Market/Greene Alternative and approximately 1.2 miles from the Havana Alternative, and the Monroe Street Dam approximately 3.5 miles downstream from Market/Greene and approximately 4.3 miles from the Havana Alternative.

Market/Greene Alternative (Preferred Alternative)

The floodway is the section of the river which must be unobstructed so the water surface elevation of the base flood is not raised by more than 1 foot. ~~There is a 100 meter (330 foot) wide floodway zone (fastest moving portion of the river during the 100-year flood) at the Spokane River crossing.~~ The average floodway zone (the main waterway section of the floodplain) is approximately 100 meters (330 ft.) in width at the Spokane River crossing. The 100-year flood boundary on the south side extends approximately 9 meters (30 feet) beyond the floodway zone. There is an existing bridge located at Greene Street. The 100-year flood elevation of the Spokane River at the Greene Street bridge is approximately 577 meters (1,892 feet).

Market/Greene (Preferred Alternative) — North Option

This option does not cross the Little Spokane River; therefore, there will be no new bridges or earthwork in a flood plain at this location.

Market/Greene — South Option

This option does not cross the Little Spokane River; therefore, there will be no new bridges or earthwork in a flood plain at this location.

Havana Alternative

There is a 46 meter (150 foot) wide floodway zone at the Spokane River crossing. The 100-year flood boundary on the south side extends approximately 79 meters (260 feet) beyond the floodway zone. The 100-year flood elevation of the Spokane River at Havana Street is approximately 578 meters (1,895 feet). The closest

existing bridge is located at Greene Street.

Northeast of the intersection at Francis Avenue and Havana Street, there is an area with a defined Zone “B” flood boundary. Zone “B” designates an area of possible shallow flooding (less than one foot). The area has no wetland characteristics (see **Figure 4-13**).

Havana — North Option

This option does not cross the Little Spokane River; therefore, there will be no new bridges or earthwork in a flood plain at this location.

Havana — South Option

This option does not cross the Little Spokane River; therefore, there will be no new bridges or earthwork in a flood plain at this location.

I-90 Collector/Distributor (C/D) System (part of the Preferred Alternative)

The I-90 C/D does not fall within any flood plain or floodway zones.

Impacts

(For discussion of construction activity impacts, see the Construction Activity Impacts section of this EIS.)

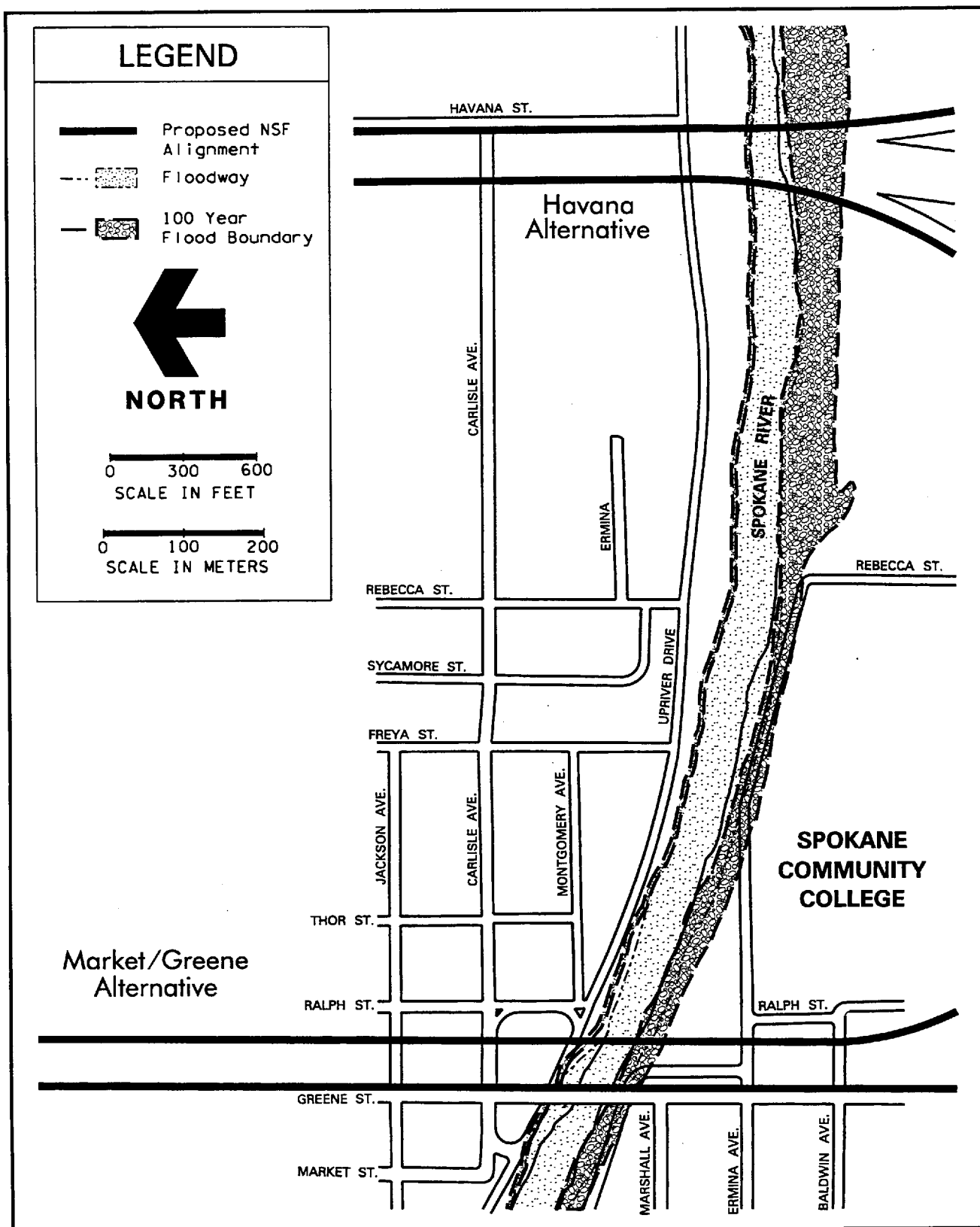
No-Build Alternative

The No-Build Alternative would not alter or cause impacts to the existing conditions in the project area.

Market/Greene (Preferred Alternative) and Havana Alternative

The channels of a meandering stream may change during flooding within the stream’s natural meander pattern, acting as a natural flood control mechanism (flood plain). The river banks in the vicinity of the Market/Greene Alternative are already artificially stabilized, up and down stream from the existing Greene Street Bridge. There is currently no bridge across the Spokane River at Havana; a new bridge at Havana could affect the meander pattern of the Spokane River. However, both the proposed Market/Greene and Havana structures will have bridge abutments and approach fills outside the wetlands and the 100-year flood plain, except for bridge piers. Piers will most likely be located in the FEMA floodway or 100-year flood plain, depending on final design. Any increase in high water levels due to floodway/flood plain encroachment (piers only) will be negligible and within the allowable limits of city shoreline and flood plain regulations.

According to the City of Spokane’s Shoreline Master Program, no structures are allowed in the floodway zone if they would raise the possibility of flooding. Communication with the Corp. of Engineers has shown no major problems with piers within the waterway zones. Any increase in high water levels due to floodway/flood plain encroachment (piers only) will be negligible and within the allowable limits as per City Shoreline and flood plain regulations.



**Market/Greene (Preferred Alternative) and Havana Alternative
Flood Plains — Area 1
Figure 4-12**

LEGEND

Zone B,

Area of Shallow Flooding < 0.3
Meters (1 Foot) in Depth.

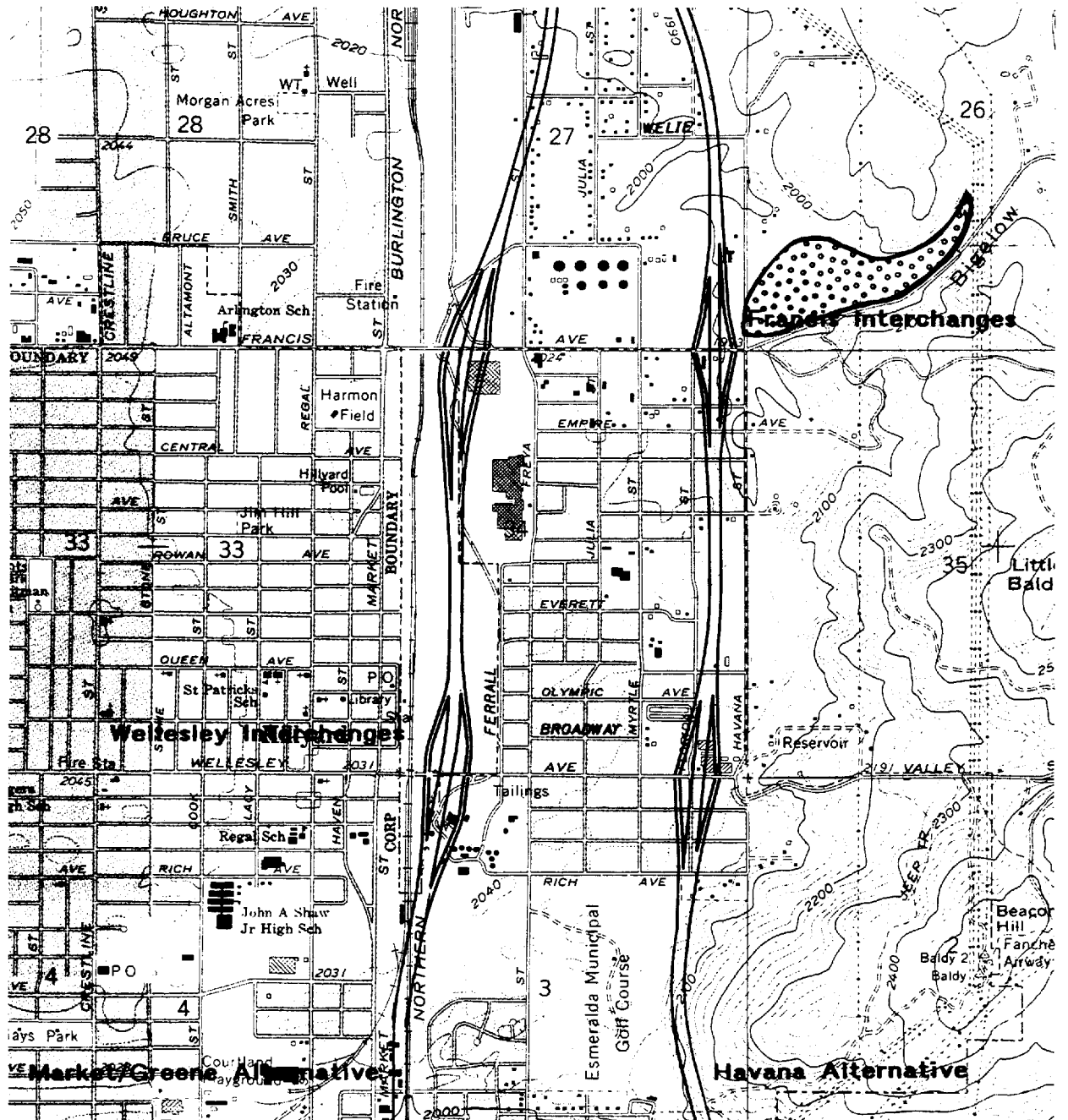


0 1 2

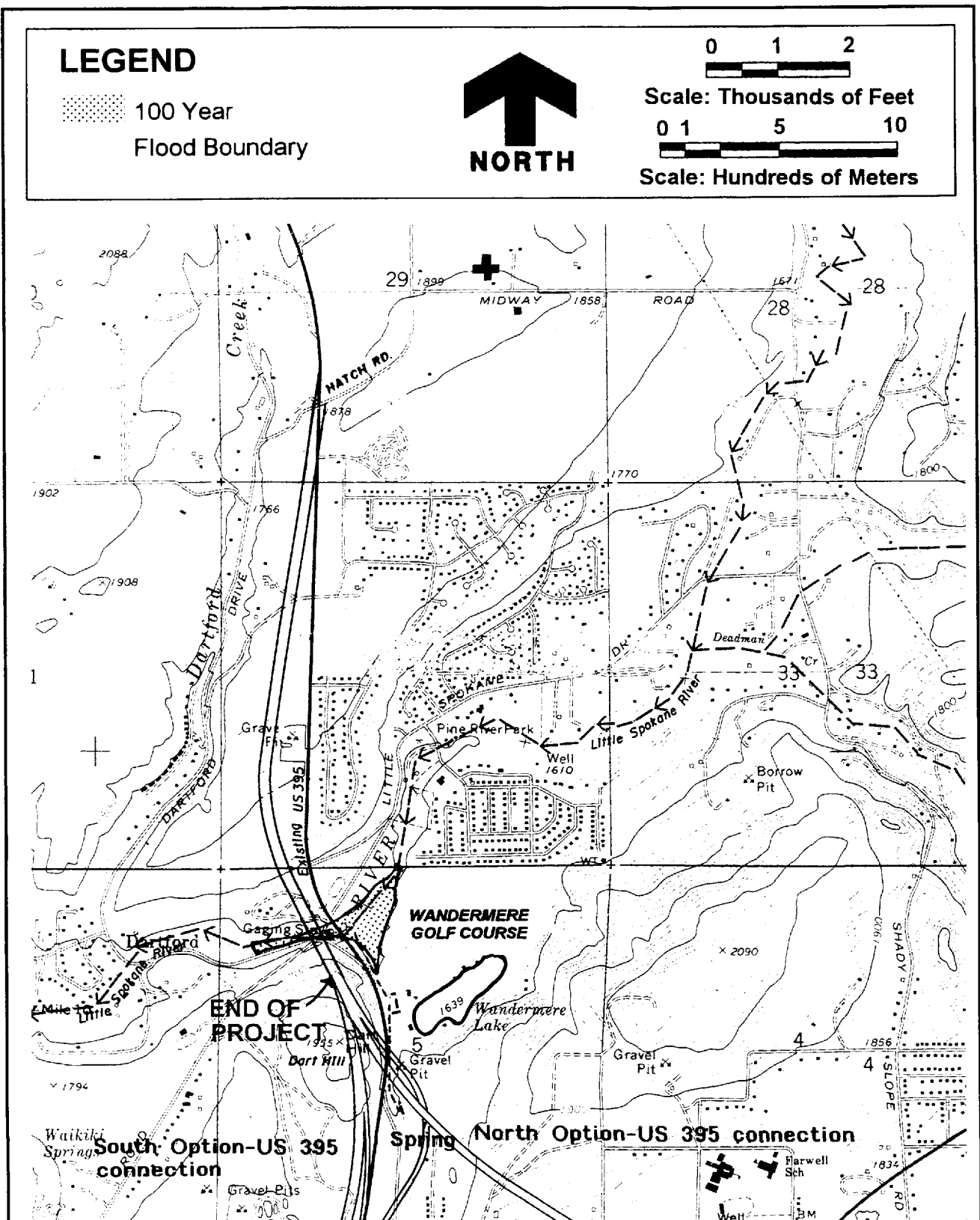
Scale: Thousands of Feet

0 1 5 10

Scale: Hundreds of Meters



**Market/Greene (Preferred Alternative) and Havana Alternative
Flood Plains — Area 2**
Figure 4-13



**North Option (Preferred Alternative) and South Option
Flood Plains — Area 4
Figure 4-14**

The Havana Alternative will have no direct impact to the Zone “B” flood plain located to the northeast of the intersection at Francis Avenue and Havana Street. The area has no wetland characteristics. Indirect impacts of project construction to the south of the Little Spokane River will be avoided by use of water quality/ quantity BMPs (see **Figure 4-13**).

Operation of any of the proposed alignments will not promote incompatible flood plain development and attendant increases in water flows or flood dangers. Impacts will be avoided through the use of water quality/quantity BMPs within their design parameters. The proposed bridge crossing the Spokane River and roadway approaches to the bridge will neither create flooding nor be adversely affected by flooding, since the entire 100-year flood plain will be spanned.

North Option (Preferred Alternative) and South Option

The project will not encroach on the regulated flood plain or floodway of the Little Spokane River. The NSF ends before reaching the Little Spokane River. Indirect impacts from project operation, south of the Little Spokane River, will be avoided by use of water quality/quantity BMPs.

Mitigation

No mitigation is proposed.

Water Quality

Studies and Coordination

The following references were consulted:

1. *The Spokane Aquifer, Washington: Its Geologic Origin and Water-Bearing and Water-Quality Characteristics*, by Dee Molenaar
2. Spokane County Water Quality Management Program, Ground Water Data Base 1992-93
3. Spokane Aquifer, Cause and Effect Report, Dec. 1978, by Larry Esvelt P.E. Ph.D.
4. U.S. Geological Service (USGS) Bulletin No. 27
5. USGS quadrangle maps

The EPA is a cooperating agency, but has directed WSDOT to confer with Spokane County on matters concerning the Spokane Sole Source Aquifer. Water quality parameters and present water quality data were obtained from the Spokane County Aquifer Protection Office and Washington State Department of Ecology (Ecology).

Public and private wells near and within the proposed right of way were identified with assistance from the Spokane County Aquifer Protection Office and the city of Spokane (see **Figures 4-15 through 4-18**).

All proposed NSF alignments were field investigated to obtain a thorough overview of the project area.

The infiltration capacity versus the runoff rate of the various soil types within the project area were analyzed. A rainstorm with a 10-year recurrence interval was used in the analysis. Results are shown in **Table 4-20**; areas of poor infiltration